



B155 Case Studies: Interesting Kinship Problems Solved During WTC Identification Efforts

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After attending this presentation, forensic DNA analysts will be informed of various types of pedigrees reconstructed, and other issues faced, in order to identify victims from the WTC disaster.

Identification of remains from the WTC has brought closure to hundreds of victims' families. Also, DNA and related information technology has been advanced far ahead of the normal pace of standard research, in order to make those identifications.

Relatively easy DNA identifications can be made using known victims' blood samples (e.g. from the national bone marrow donor registry) or personal effects (toothbrushes, hairbrushes, razorblades, etc.), supported by multiple familial DNA samples (parents and siblings, spouse and children, or some combination thereof). The identification process therefore also included the verification of not only all available DNA data for all associated remains, but also the physical items and information provided by victims' families and friends, used in the DNA identification process. Confirmation of who brought in what DNAbearing items for which victim is paramount. For instance, wives occasionally turned in their own toothbrushes instead of their husbands'; well-meaning co-workers brought items in from workplace lockers of all the missing persons from that location (at least one three-way switch is known to have been made) or no collection information at all was obtained ("donor name" was either left blank, or filled in with the missing person's name). Occasionally it was found that "fathers" or "children" of victims really weren't. All of these situations require substantial meta-data analysis prior to even attempting kinship calculations.

Kinship samples, used to validate personal samples of unknown or unconfirmed origin (incomplete chains of custody were rampant), were also used to make identifications outright. In addition, confirmed (either by kinship analysis or by confirming the donor) personal effects in combination were used to make many identifications. One or more matching personal effects in addition to at least one family member allowed much higher confidence levels in those identifications.

Occasionally, analysts working on disaster identifications had to "get creative" to solve intractable cases, especially ones where multiple persons related either by blood or address (such as spouses or apartmentmates) both perished at the World Trade Center.

In one case, a brother and sister both died. She had no children, and the personal item submitted for the sister yielded no DNA. However, the brother had a wife and son; and one other sibling was available. Using the sister, the missing brother's comb, and the victim's sister-in-law and nephew enabled the identification of the missing sister in this pair.

The adult children of a couple who died in the tragedy, along with her parents (his were not available) and his sister, submitted buccal swabs for use in kinship analysis. A male fragment of remains came up as a potential "hit" for this family. Using direct lineages from this fragment to the couple's children and his sister only, did not meet the statistical threshold set for this project, although it did indicate a strong relationship probability. Addition of his in-laws' DNA samples (as grandparents of his children) to the pedigree made up for the fact his wife's DNA profile was unknown (her DNA, after all, had to have been derived from her parents'), and raised the probability into the acceptable range to declare the identification.

A pair of brothers were lost on 9/11. Both men's wives donated personal effects in the form of razors and toothbrushes, and kinship swabs were donated by their parents. In a case such as this, kinship alone is not sufficient to show which son was which, since both are related in the same way to their parents. One of the brothers was identified early on, by kinship, before it was known that his brother was missing also. The case records were reviewed and it was found that their files (and corresponding personal items) were jumbled together. The group of personal effects had two male profiles between them which showed relatedness to the parents of these two missing men. Eventually a distinguishing factor was found between the two cases, and enabled analysts to determine which profile came from which brother. Ultimately, remains were found which matched both sets of items and both men were declared identified.

In general, the more samples which can be donated for a missing person, the better. Problems ranging from poor DNA yields to wrong DNA types can be often overcome by use of kinship samples to verify that the submitted personal item was used by a member of a given family, and that the profile fits well in the pedigree in the victim's place. Once a validated personal effect matches a disaster sample, that is an identification.

World Trade Center, Kinship Analysis, Identification